

NOTES ON THE CLUSIACEAE - CHIEFLY OF PANAMA. I.

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The preparators of the Flora of Panama have been good enough to give me the privilege of examining the large series of Clusiaceae more recently collected in Panama in the field survey of the interesting and complex flora of that country, which bridges those of Central America to the north and continental South America to the south. Besides yielding many endemic taxa of its own, the flora partakes to a great extent of much of that of the two neighboring regions.

Therefore, any phytotaxonomic or phytogeographic study of Panama requires an examination of affinities northward into Mexico, southward through the Andean countries to Bolivia, and eastward into Venezuela. Such geographic connections will be abundantly demonstrated in this projected short series of papers which will make names and nomenclatural changes available for the Flora of Panama.

There is no intended significance in the order of presentation of taxa. Comments on the genus Clusia, being the largest of the family and the most difficult, would be offered last.

The genera Symphonia and Mammea are both generally treated as monospecific in America. Two species of the first, including the American S. globulifera, are commonly recognized in tropical Africa, while perhaps 20 species are variously recognized for Madagascar.

Mammea americana L., the type of that genus, is indigenous in the Antilles, Central America, and northern South America, and is commonly cultivated throughout the tropical world because of the large delicious fruit which it produces in abundance. There appear to be two species native to tropical Africa, and, if transfers from Ochrocarpos are correctly made, then numerous species in Madagascar, Malesia, and Pacifica. Further comment is offered under Mammea.

These observations are made because of the historic and geographical significance of such distributions, a pattern for which is found among other genera of the Clusiaceae.

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Symphonia globulifera L. f. Suppl. 302. 1781.

Symphonia fasciculata (Pl. & Tr.) Vesque, DC. Monogr. Phan. 8: 232. 1893.

S. coccinea (Aubl.) Oken. Allg. Naturgesch. 3<sup>2</sup>: 431. 1841,  
= Moronobea coccinea Aubl. Hist. Pl. Guiane Fr. 2:  
789 (excl. Fig. a-j which are of Symphonia globulifera  
L. f.). 1775.

Type. Linnaean Herbarium No. 853. Linnaean Society.  
London.

In America as well as in Madagascar Symphonia is variable and has been responsive to ecologic gradient. High mountain forms, for instance, tend to have larger flowers and reduced cymes. Vegetative modification may be parallel. These modifications have not seemed, possibly in large part because of inadequacy of materials, to be correlatable with geography. For these reasons I have made no attempt to initiate any systematic review of such infraspecific variation within Symphonia globulifera, and have not attempted to assess the two recent propositions of R. E. Schultes, viz., S. microphylla<sup>2</sup> and S. utilisima<sup>2</sup>.

Now, because of the excellent and convincing series of collections of Symphonia globulifera centered around Cerro Santa Rita, Colón, Panama, an area known for a selective narrow endemism, I am required to recognize the local narrow-leaved form as the var. angustifolia. This action will stimulate inquiry into the composition of the remainder of the species.

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Schultes, R. E. Bot. Mus. Leaflet. Harvard Univ. 17: 20-22. 1955.

Symphonia globulifera L. f. var angustifolia Maguire, var nov

Folia peranguste lanceolata, 8-12(18) mm lata, 4-6(8) cm longa; sepalis submembranaceis, minute fimbriatis, jugis exterioribus acutiusculis; arboribus parvis.

Type. Santa Rita Ridge east of transisthmian highway, alt 300-400 meters, tropical wet forest, tree 4 meters, flowers red, Prov. Colón, Panama, 16 Dec 1972, Alwyn Gentry 6557 (holotype MO, isotype NY).

Distribution. Apparently a narrow endemic confined to the Santa Rita Ridge as indicated by the following citations:

PANAMA. Prov. Colón, summit of Cerro Santa Rita: shrub 5 ft, latex yellow, flowers pink, 1200-1500 ft alt, 13 Sept 1947, Paul H. Allen and Dorothy O. Allen 5101 (NY, MO); shrub to 15 ft, fruit red, 19 km from main highway, Jan 1968, J. D. Dwyer 8580 (MO, sheet 1); shrub to 10 ft, buds rose colored, 19 km from transisthmian highway, 28 Jan 1968, Dwyer 8580 (MO, sheet 2); arbol delgado de 7 m, flores rojas, látex amarillo, zona maderera de Santa Rita, 10 Oct 1968, M. D. Correa y R. L. Dressler 1085 (MO, 2 sheets); arbolito de 7 m, flores coral, frutos chocolates, látex amarillo, camino maderero de Santa Rita, 20 Mar 1969, Correa y Dressler 1205 (MO); shrub 3 m, flowers red, ovary yellowish, fruit pink, plants in vegetative condition appear to be abundant in the area, near Agua Clara rainfall station, 23 Apr 1970, Robin Foster 1738 (MO); slender tree ca 4 m high, buds rose-colored, along road ca 1 mi from Boyd-Roosevelt Highway, 9 Jul 1971, Croat 15337 (MO, NY); tree 4 m, flowers red, east of transisthmian highway, 300-500 m alt, tropical wet forest, 16 Dec 1972, Gentry 6557 (holotype MO, isotype NY); tree 3 m, petals rose-red, sap yellow, 15 km from Boyd-Roosevelt Highway, 450 m alt, in wet forest, 14 Mar 1975, Mori & Kallunki 5057 (MO). Prov. Panama: 5-6 mi north of El Llano, near San Blas border, 1300 ft alt, tree 10 meters, flowers red, 8 Sept 1972, Gentry 5814 (MO).

Mammea L.

As indicated here above, the genus Mammea is represented historically by a single American species, M. americana L., and a single African species, M. africana D. Don. Should Mammea, especially the American species, be treated as conspecific with Ochrocarpos (Ochrocarpos africana Oliver), the broader genus then would consist of some 50 species. I attempt no generic evaluation here.

Our attention to the genus Mammea, in the restricted sense, is occasioned by a recent collection, Mori, Kallunki & Gentry 4699, made in interior Panama, which I immediately associated with M. africana, in the assumption that its occurrence in Panama is the result of introduction.

However, Doctor Mori (personal communication) is of the very strong opinion that this tree in question is established as a well defined population in primary woodland and does not bear evidence of introduction. Mori has offered the view that the tree is indigenous.

Should this be the case, then, as for Symphonia globulifera, we should be confronted with a second amphi-Atlantic species representing the two indicated species, or that we have here a narrow endemic American species (the second for the Western Hemisphere), but one closely allied to Mammea africana D. Don.

The Mori-Kallunki-Gentry collection is in mature fruiting condition. To resolve the problem here presented, it will be necessary to reexamine the population in the field so as to reach a further considered opinion as to its possible indigenous character, and more especially to collect an adequate series of specimens in flowering, young fruiting, and mature fruiting condition. Fluid-preserved specimens should be obtained for cytological and morphological examination.

PANAMA. Prov. Panama: tree 30 m tall, fruit brown, warty, 4-locular, 4-seeded, wet forest at 350 m alt, El Llano-Carti Road, 12.7 km from Inter-American Highway, 15 Feb 1975, Mori, Kallunki & Gentry 4699 (MO).

Chrysochlamys Poeppig

The separation of the four genera, Tovomita, Tovomitopsis, Chrysochlamys, and possibly Balboa, is at best maintained on tenuous morphologic grounds. It may at some date of more advanced knowledge of them be required to bring these names together under a single generic designation. To do so, however, if even-handed application of criteria is applied, would also require a larger sweeping performance among other clusioid genera. This I would be loathe to make.

Chrysochlamys clusiaefolia Maguire, Bol. Soc. Venez. Cien. Nat. 25: 225. 1964.

To the present time Chrysochlamys clusiaefolia had been known only from the region of the coastal Andes of Venezuela. Now a collection of undoubted assignment to the species has been made in the considerably disjunct Serranía del Darien, along the Panamanian-Colombian frontier. Other comparable geographical disjuncts are well known.

The Panamanian collection is faithful to the facies and form of the Venezuelan plants except that its flowers (male) lack the closely subtending outer pair of sepals (? bracts) which are characteristic of all of the original specimens. The subspecies offered here is based upon that distinction.

Chrysochlamys clusiaefolia Maguire subsp. clusiaefolia

Small or median-sized trees of wet primary forests above 1000 m altitude, Venezuelan coastal Cordillera: Estados Aragua, Yaracuy, Falcon, and Dist. Federal.

Chrysochlamys clusiaefolia Maguire, subsp. panamaensis Maguire, subsp. nov

Subspeciei clusiaefoliae similis, jugis parvis sepalis exterioribus deficientibus exceptis.

Type. Tree 10 m, buds green, lower montane wet forest, 1400 m alt, base camp, Cerro Mali, Serranía del Darien, Panama, Colombian frontier, 21 Jan 1975, A. Gentry & S. Mori 13769 (holotype MO).

Known only by the type collection.

Chrysochlamys sp nov, aff Ch. clusiaefolia Maguire

The specimen cited below is not determinable.

PANAMA. Prov. Coclé: small tree, fruits green in axillary and extra-axillary clusters, latex scanty, greenish-white, elfin forest, Cerro Caracoral, 1000 m alt, 19 Jan 1968, Duke & Dwyer 15102 (MO).

Obviously more of this entity should be sought.

Standley and Williams have described three species of Chrysochlamys from Panama, viz Ch. pauciflora Standley, Ceiba 3: 214. 1953, and Ch. eclipses L. Wms. and Ch. standleyana L. Wms., Trop. Woods 111: 15-16. 1959. I have not had opportunity to form judgment on these three proposals.

Tovomitopsis Planchon & Triana

As indicated earlier in this paper, the significant morphologic qualities of the genera Tovomita, Tovomitopsis, and Chrysochlamys are inadequately investigated. L. O. Williams<sup>3</sup>, careful student of Central American botany, while admitting the inadequacy of morphologic, anatomic, and biologic evidences, has nonetheless brought Tovomita and Tovomitopsis together under the former name.

This action, while understandable, I feel is somewhat premature. More detailed study should give sounder basis for such taxonomic and nomenclatural adjustment.

Repeatedly the question has been put to me as to the distinction of the three generic groupings. I am unable to give matured judgment on the matter at this time, as said above, because of the inadequacy of information of structural flowering and fruiting details. I thus offer here below a tentative generalized table which purports to separate the three entities, and with which my own work must suffice until further detailed study is accomplished.

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Williams, L. O. Guttiferae from Middle America.  
Tropical Woods 111: 15. 1959.

	Sepals	Petals	Stamens	Ovary	Aril	Inflores- cence
<u>Tovomita</u>	Sepals 2-4, the outer valvate, exceeding and enclosing other flower parts.	Petals 4-(5-8), decussate to somewhat imbricate.	Stamens numerous, free or united at the base.	Ovary 4-(5) locular, locules 1-ovulate.	Exarillate, outer integument carinose, ariliform.	Inflorescence axillary and/or terminal.
<u>Tovomitopsis</u>	Sepals 4, decussate, outer smaller and shorter than inner, not exceeding or enclosing other flower parts.	Petals 4-5, decussate.	Stamens numerous, free or united at base.	Ovary 4-5-locular, locules 1-2-ovulate.	Exarillate, integuments (1 or both) carinose, sacciform.	Inflorescence axillary and/or terminal.
<u>Chrysochlamys</u>	Sepals 5, imbricate.	Petals 5, imbricate.	Stamens numerous, free or congested in center.	Ovary 5-locular, locules 1-ovulate.	Exarillate, integuments (? 1 or both) carinose, sacciform.	Inflorescence cauliflorous.

Tovomitopsis angustifolia Maguire, sp nov

Frutex parvus, dioecius, 2 m maximus; ramulis tenuibus, teretibus; latice albedo; foliis appositis, anguste elliptico-lanceolatis, laminis vulgo 8-11 cm longis, 1.0-1.5 cm latis, apicibus basibusque anguste acuminatis; venis lateralibus paucis, vulgo 4-5, non-binatis, valde sursum arcuatis; petiolo 8-10 mm longo, tenui, anguste alato; inflorescentiis terminalibus, cymosis; masculinis: inflorescentiis ad 5 cm longis, vulgo 8-18-floribus; alabastris maturis globosis, 5-8 mm longis; sepalis decussatis, jugis exterioribus ovatis, obtusis, 3-4 mm longis; interioribus floribus includentibus; staminibus numerosis sed paucioribus quam 50, filamentis crassis, 3-4 mm longis; antheris oblongis, ca 0.5 mm longis, lateraliter dehiscentibus, 4-locularibus; granis pollinis tricolporatis, sphaeroideis, poris prominentibus, sulcis non-prominentibus, 22-24  $\mu$  diam, sporodermate reticulato; foemineis: floribus mihi non visis; fructibus pyriformibus, stipitatis, ca 2 cm longis, 5-locularibus, loculo dispermis; placentatione axiali elongata; seminibus 5-6 mm longis, ca 1.5-2.0 mm latis, embryone non-differentationi, semine omnino in membrana involuta; gynobasi angusta, ca 5-6 mm longa; stylis 5, cornutis, ad bases connatis, ca 2 mm longis, stigmatibus sessilibus, anguste obovatis, ca 1 mm longis, distaliter introrsis.

Type. Shrub 2 m tall, petals white, filaments yellow, on road to Calovebora, along stream, NW of Santa Fe, 2.7 km from Escuela Agricola Alto de Piedra, Veraguas, Panama, 30 Mar 1975, S. Mori & J. Kallunki 5357  $\sigma$  (holotype MO, isotype NY).

Distribution. Known certainly only from the Province of Veraguas above Santa Fe.

PANAMA. Prov. Veraguas: shrub 0.5-1.2 m tall, fruits green tinged with red, flowers white, Río Primero Braso, 2.5 km beyond Agriculture School Alto Piedra near Santa Fe, elev 700-750 m, 24 Jul 1974, Croat 25437 (MO, NY); much-branched shrub 1-2 m tall, forming clumps along stream edge, cut twigs exude milky sap, tropical wet forest, Atlantic Slope, 16 Nov 1974, Mori & Kallunki 3179 (MO, NY); 2.7 km from Escuela Agricola Alto de Piedra, 30 Mar 1975, Mori & Kallunki 5357 (holotype MO, isotype NY); streamside shrub to 2 m tall, very common, petals white, stamens yellow, NW of Santa Fe, 11 km from Escuela Agricola de Piedra, in valley of Río Dos Bocas, Atlantic slope, 450-550 m alt, 17 May 1975, Mori & Kallunki 6125 (NY). Gentry 8764, Río Guanche, 1-4 km upstream from Portobelo Road, 0-100 m alt, tropical wet forest, Colón, Panama, 10 Dec 1973, is doubtfully referred here. The specimen is inadequate for determination.

Tovomita Aublet

The genus Tovomita is the second largest of the American clusioid genera and, second to the largest genus, Clusia, possessive of the greatest range. Any consolidation of satellite genera with Tovomita would require that the Aublet name be retained.

Within these brief notes only two species will be given reference: Tovomita weddelliana, a long established and much fragmented species, and T. croatii, herein offered as new.

Because of its great range, extensive nomenclatural history, and diversified morphology, I here offer a rather full description of the species to include all here indicated segregates, some of which may indeed prove to represent geographic variants.

Tovomita weddelliana Planchon & Triana, An. Sc. Nat. Ser. 4.  
Bot. 14: 277. 1860.

Clusia oblanceolata Rusby, Desc. S. Am. Pl. 58. 1920.

Type. Valparaiso, Santa Marta, Colombia, 20 Mar 1899, H. H. Smith 1880 (NY).

Clusia pithecobia Standl. & L. Wms. Ceiba 1: 244. 1951.

Rio Piedras Blancas, Prov. Puntarenas, Costa Rica, 3 Aug 1950, Allen 5592 (F).

Tovomita longicuneata Engl., Bot. Jahrb. 58. Beibl. 130:

7. 1923. Type. Manzon, Huanuco, Peru, 900--1000 m, ♂, Apr 1904, Weberbauer 3446 (B).

?Tovomita sphenophylla Diels, Notizblatt 14: 32. 1938.

Tovomita rhizophoroides Cuatr., An. Inst. Biol. Mex. 20:

101. 1949. Type. Rio Naya, Valle, Colombia, Cuatrecasas 14280 (F).

Tovomita ligulata Cuatr., An. Inst. Biol. Mex. 20: 99.

1949. Type. Rio Digua, Valle, Colombia, 27 Aug 1943, Cuatrecasas 14949 (F).

Tovomita lanceolata Cuatr., An. Inst. Biol. Mex. 20: 102.

1949. Type. Rio Calima, Valle, Colombia, Cuatrecasas 21278 (F).

Tovomita glossophylla Cuatr., Rev. Acad. Col. Cien. 8:

62. 1950. Type. Quebrada del Caquetá, Caquetá, Colombia, 6 Apr 1940, Cuatrecasas 9194 (US, F).

Tovomita angustata Steyer., Fieldiana Bot. 88: 399, fig.

82. 1952. Type. Kavanayén, Bolívar, Venezuela, 23 Nov 1944, Steyermark 60475 (holotype F, isotype NY).

Dioecious tree or often the flowers hermaphrodite, to 15 m high, branchlets terete, latex moderate milky or cream-colored; leaves opposite, subcoriaceous, narrowly oblanceolate, (6)10-25(28) cm long, 2-5 cm broad, the apex acute or short acuminate, gradually drawn to a narrow abrupt base; petiole 3-5 mm long; midrib prominent, especially on the lower surface; primary veins prominulous, 1.0-1.5 mm apart, rising at a 10° angle; inflorescence cymose, terminal or axillary; staminate inflorescence open, seldom conferted, multiflorous, to 20(25) cm long, primary branches to 8 cm long; flower buds globose, when mature commonly 6 mm long, pistillate buds larger than the staminate; sepals 2 pairs, decussate, suborbicular, concave, the external pair in the bud longer than and enclosing the interior pair and the other flower parts, the margins subconnivent or the first somewhat overlapping the second; petals 4, decussate, oblong to obovate, commonly 6-8 mm long; male flowers: buds commonly 4 mm long; stamens numerous, filaments free, ca 2 mm long, thickened at the base, borne on a corona ca 0.5 mm high, anthers 2-lobed, ovoid, ca 0.5 mm long, connective narrow; pollen tricolporate, broadly oblong-elliptic, to 45  $\mu$  in equatorial view, rounded, 25-30  $\mu$  in polar view, exine minutely granular; stamens or staminoidea numerous, when fertile similar to those of  $\sigma$  flowers; ovary 5-6-locular, ovule solitary in each loculus, gynobase prominent; placenta axillary, linear, ca 10 mm long, central; embryo erect, little differentiated; stigmas 5-6, sessile; fruit strongly pyriform, commonly 4-5 cm long, the base narrowed forming a gynobase to 2 cm long, above the middle enlarged, obovate, stigmas sessile, obovate, 2.5-3.0 mm long; seed solitary in each loculus, seed linear, 15-16 mm long, 5-6 mm thick, somewhat 3-angled; seed coat 0.2-0.3 mm thick, indurated; seed enveloped in a fleshy mass possibly arillar in nature.

Type. Bolivie septentrionale, vallée de Tipuani, province de Iarecaja, Weddell ann. 1851 (holotype B).

Distribution. Tovomita weddelliana becomes a tree to 15 m tall, is a forest dweller or may occur in more open ecotone habitats. It ranges from Costa Rica to Peru and Bolivia along the Andean axis; in the Venezuelan Andes to the Federal District, and in the eastern Guayana Highland.

It is difficult to assign a center of distribution. Leaves are greatly variable in size and form (the chief basis of segregation), as noted in the description. Evaluation of any of the several varietal designations must await more adequate collection.

Some 72 collections have been examined in this review of Tovomita weddelliana. Only those of Panama, numbering 22, are cited herein:

PANAMA. Prov. Colón: shrub 2 m (tree at maturity), Santa Rita Ridge, 1 Mar 1971, Croat 13896 (MO); 7 meter tree, 10 mi SW of Puertobelo, 2-4 mi from coast, 10-200 m alt, 24 Mar 1973, Liesner 1058 (MO); tree 8 m tall, Río Guanche, near Portobelo, tropical wet forest, 25 m alt, 24 Mar 1975, Mori & Kallunki 5216 (MO). Darien: stilted tree, 8" dbh, fairly common in elfin forest, latex not obvious, fruits green, Cerro Pirre, 2500-4500 ft, 9-10 Aug 1967, Duke & Elias 13733 (NY). Panamá: tree 15 ft tall, fruits green, Cerro Jefe, 14 Feb 1968, Correa & Dressler 721 (MO); árbol 10 m alto, látex, fruto rojo-verde, camino de Llano a Cartí, altura  $\pm$  400 m, 20 Feb 1973, Correa, Dressler et al 1855 (MO); small tree to 4 m, leaves leathery, sap white, 200-500 m alt, 19 km above Pan-American Highway on road from El Llano to Carti-Tupile, 20-21 Feb 1973, Kennedy 2516 (MO); tree 10 m tall, 15 cm dbh, premontane wet forest along El Llano-Carti road, 16-18-1/2 km by road N of Pan American Highway at El Llano, alt 400-450 m, 28 Mar 1974, Nee & Tyson 10973 (MO); tree 7 m tall, 10 cm dbh, wet forest, 350 m alt, El Llano-Carti Road, 17.5 km from Inter-American Highway, 14 Feb 1975, Gentry, Mori & Kallunki 4597 (MO). San Blas: primary forest, along newly cut road from El Llano to Carti-Tupile, Continental Divide to 1 mi from Divide, 300-500 m alt, 30 Mar 1973, Liesner 1269 (MO). Veraguas: tree, stilt roots, 60 ft, milky latex, flowers white with yellow stamens, vicinity of Santa Fe, forested slopes of Cerro Tute, 3000 ft alt, 24 Mar 1947, P. H. Allen 4352 (MO, NY); tree 4 m, flowers in bud, white, fruits green tinged with purple, along Río Dos Bocas, ca 12 km beyond Santa Fe, 450 m alt, 25 Jul 1974,  $\sigma$ , Croat 25781 (MO); tree 6 m, flowers white, stamens and style yellow, fruits purplish, along road between Escuela Agricola and Alto Piedra (above Santa Fe) and Río Dos Bocas ca 5-8 km from Escuela, 730-770 m elev, 26 Jul 1974, Croat 25961 (MO, 2 sheets); tree 10 m, flowers white, Valley of Río Dos Bocas, 11 km from Escuela Agricola Alto Piedra (Above

Santa Fe) on the road to Calovebora; primary forest along river, 450 m alt, 30 Aug 1974, Croat 27492 (MO); tree 4 m, Valley of Río Dos Bocas along road between Escuela Agrícola Alto Piedra and Calovebora, 15.6 km northwest of Santa Fe, primary forest, along trail to Santa Fe, steep forested hill east of river, 450-550 m alt, 31 Aug 1974, Croat 27664 (MO); shrub 4 m tall, fruit red, along stream, NW of Santa Fe, 2.6 km from Escuela Agrícola Alto de Piedra, 23 Feb 1975, Mori & Kallunki 4761 (MO).

Panama specimens with more obtuse or rounded apices are: Prov. Panamá: tree 25 m, flowers white, in forest about 1 mi upstream from Frizzel's Vinca Indio, on slopes of Cerro Jefe, 9 Sept 1970, Foster & Kennedy 1832 (MO); epiphytic shrub, top of Cerro Jefe, 1 Apr 1972, Gentry 4877 (MO, NY); tree 15 m, old fruit reddish, Cerro Jefe, 22 Sept 1972, Gentry 6146 (MO).

Panama specimens with smaller shorter leaves in the manner of Tovomita rhizophoroides: Prov. Coclé: shrub 3 m, La Messa above El Valle, in forest on both sides of junction with road to Cerro Pilon, elev ca 800 m, 21 Jul 1974, Croat 25422 (MO, NY). Prov. Panamá: arbol, altura de 10 m, con raíces fulreas y leche color crema, Cerro Azul, 600 m alt, 15 Abr 1971, E. A. Lao & L. A. Holdridge 31 (MO).

Tovomita croatii Maguire, sp nov

Frutex ad 5 m altus; ramis teretibus; foliis sessilibus, subamplecticaulibus, chartaceis, ellipticis vel late oblanceolatis, acuminatis, vulgo 7-10 cm latis, 17-28 cm longis, integris, pinnivenatis, venis primariis in nervo marginale collectis, glabris, subtus valde vittatis, conspicue squamoso-punctatis; inflorescentiis terminalibus cymosis, multifloribus, ramulis ad 10 cm longis, bracteis conspicuis oblanceolatis vel lanceolatis vel lineari-lanceolatis, ad 15 mm longis; floribus masculinis: sepalis 4, decussatis, 2 exterioribus valvatis, 2 interioribus involventibus et excedentibus, ad 12 mm longis, convexis, vittatis; staminibus plus minusve 20-30, filamentis teretibus, 3-4 mm longis, liberis, antheris bilobatis, ca 0.6 mm latis, 0.4 mm longis, hippocrepiformibus, lobis lateralibus; polline parvo, tricolpis, ca 22-25  $\mu$  diam; floribus foemineis: non visis; fructibus elliptico-ovalibus, ca 18-20 mm longis, 5-locularibus, loculis dispermis, stylis partibus liberis, ca 0.5 mm longis, stigmatibus terminalibus, orbicularibus; seminibus linearibus, in membranis (tegumentorum?) longis, subcarnosis, involutis, axe subbasi affixis; endospermio relative magno, embryo erecto, tenuiter lineari involuto.

Type. El Valle, behind Club Campestre, shrub 2 m, flowers white, sap viscid, cloudy, Prov. Coclé, Panama, 12 Apr 1971, Thomas B. Croat 14268A (holotype MO).

Distribution. PANAMA. Prov. Bocas del Toro: shrub 1-2 m tall, bracts mauve and maroon, between Q. Gutierrez and east slope of La Zorra, headwaters of Río Mali, Chiriqui Trail, 18 Apr 1968, Kirkbride & Duke 732 (MO, 2 sheets). Prov. Coclé: shrub 1.5 m, buds pinkish, Cerro Caracorral, in the rain forest below the elfin forest, 24 Apr 1968, Kirkbride 1122 (MO, 2 sheets); shrub to 15 ft, fruits cream flushed with red, seeds 7 (as seen in X-sect), elongate, testa red, pulp of fruit colorless, sticky, 25 Jul 1968, Dwyer & Correa 8913 (MO); shrub to 10 ft, leaves not glandular-punctate, bracts and axes of infl. rose-red, as are fruits, 25 Jul 1968, Dwyer & Correa 8855 (MO); shrub to 2 m high, buds dull pink, Cerro Pilón, hill below summit, above El Valle de Antón, 2000-2700 ft alt, in rain forest, 28 Mar 1969, Dwyer, Durkee, Croat & Castillon 4556 (MO); shrub 2 m, flowers white, sap viscid, cloudy, El Valle, behind Club Campestre, 12 Apr 1971, Croat 14268A (holotype MO); shrub 2 m, flowers white, sap viscid, cloudy, Cerro Pilón (above El Valle de Antón), 13 Apr 1971, Croat 14338 (MO); 1.5 m tall, terrestrial, in tropical wet forest, Cerro Pilón, 900-1173 m, 16 Mar 1973, Liesner 783 (MO).

Tovomita croatii bears the most visibly conspicuous character of the genus, that of the external pairs of essentially connivent sepals exceeding and enclosing the remaining organs of the flower, i e, inner pair of sepals, petals, androecium and/or gynoecium, as they may be present.

The morphologic distinction among the three closely related genera, Chrysochlamys, Tovomita and Tovomitopsis, of the arillar structure is yet to be systematically investigated. The locules of the ovary in the three genera are said to be uniovulate. Yet, at least in Tovomitopsis some of the locules may produce two ovules, and therefore become bispermic. In the present species all locules seem constantly to bear two ovules and, hence, become two-seeded.

In our species, the carnose envelopes of the twin seeds appear to be of chalazal attachment. Which, or what parts of the teguments are involved, is not here determined. However, the envelopes are complete and seem to be separate for each seed.

Tovomita coriacea Maguire, sp nov

*Tovomita weddellianae* affine.

Arbor 10-20 m alta, latice albida; foliis appositis, confertis, coriaceis, anguste oblanceolatis, apicibus obtusis vel rotundatis, basibus angustis, petiolo ca 5 mm longo; venis lateralibus, 1.0-2.0 mm apartis, adscendentibus a 10°-20° angulo; floribus et staminibus non visis; floribus pistillatis: alabastris ovato-globosis, ca 5 mm longis, sepalis 4, decussatis, concavis, marginibus non-marginatis, jugis exterioribus in alabastro connatis; petalis 4; staminodiis destitutis; ovario 5-loculari, sessili, loculis uniovulatis; ovulis axe lateraliter affixis; fructu globoso ca 2 cm lato, sine gynobasi; stigmatibus 5, sessilibus.

Type. Common, pistillate tree 10-20 m, leaves at summit of branches, erect, latex creamy-white, flower buds white, fruit maroon, obovoid-ovoid, rounded at the summit, Cerro de Humo, bosque nublado virgen, 12 km norte del pueblo de Río Grande arriba, 1273 m alt, Peninsula de Paría, Estado Sucre, Venezuela, 2 Mar 1966, Julian A. Steyermark 94884 (holotype NY, isotype VEN).

Known only by the type collection, but ascribed by the collector to be common.

Tovomita coriacea is clearly related to Tovomita weddelliana Pl. & Tr., as is demonstrated by the very similar leaves, but differs from that species in the coriaceous quality of the leaves and the rotund non-stipitate fruit, the prominent gynobase being lacking.

The species is published here, although of Venezuelan origin, because of its affinity to the widespread Tovomita weddelliana. I wish to acknowledge the kindness of Doctor Steyermark, collector, for permitting me to do so.

Clusiella elegans Pl. & Tr., An. Sc. Nat. Ser. 4. Bot. 14: 254. 1860.

These apparently are initial records for Panama. The center of distribution of the species lies in Colombia. Its range extends into South American Panama, Venezuela and Ecuador.

PANAMA. Prov. Darien: epiphytic shrub, the stems rooting at nodes and becoming fastened at several points; flowers white, fruits green, vicinity of upper gold mining camp of Tyler Kirtledge on headwaters of Río Tuquesa, ca 2 air km from Continental Divide, in recently cleared primary forest, 26 Aug 1974, Croat 27213 (MO). Prov. Panamá: tree fallen, unknown height estimated over 4 m, leaves leathery, calyx green, petals white, glandular area around ovary yellow, stigma white, in tropical wet forest, 16 km above Pan-American Highway on road from El Llano to Carti-Tupile, 13 Feb 1973, Helen Kennedy, R. L. Dressler & Anne Mahler 2394 (MO); same data, 13 Feb 1973, Kennedy, Dressler & Mahler 2397A (MO); 13 Mar 1973, Croat 22894 (MO). Prov. San Blas: 13 Mar 1973, Liesner 658 (MO); 26-27 Mar 1973, Liesner 1208 (MO); 12.7 km Llano-Carti Road, 15 Feb 1975, Mori, Kallunki & Gentry 4701 (MO); same, Mori, Kallunki & Gentry 4705 (MO). Prov. Veraguas: Santa Fe, 20 Dec 1974, Mori, Kallunki et al 3875 (MO).